

CLAIMS

1. A dispenser for dispensing a metered volume of a fluid product having:-

5 (a) a storage chamber for storing the fluid product in;

(b) an outlet orifice through which the fluid product is dispensable from the dispenser; and

10 (c) a dispensing mechanism adapted in use to dispense a metered volume of the fluid product from the storage chamber through the outlet orifice;

wherein the dispensing mechanism has:-

15 (i) a metering chamber which is adapted in use to provide the metered volume of the fluid product for discharge through the outlet orifice, the metering chamber being movable between:-

20 a first volumetric state, in which the metering chamber has a first volume greater than the metered volume and is in fluid communication with the storage chamber such that, in use, an excess volume of the fluid product consisting of the metered volume and a surplus volume is transferable to the metering chamber from the storage chamber, and

25 a second volumetric state, in which the metering chamber has a second volume less than the first volume and no less than the metered volume and is isolated from the storage chamber such that, in use, the metered volume of the fluid product is contained in the metering chamber ready for dispensing through the outlet orifice; and

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- (ii) a bleed arrangement adapted in use to bleed the surplus volume of the fluid product from the metering chamber as its moves from the first volumetric state to the second volumetric state.
- 5 2. The dispenser of claim 1 in which the second volume defines the metered volume.
- 10 3. The dispenser of claim 1 or 2, wherein the metering chamber has a boundary wall structure, the metering and storage chambers are placed in fluid communication through a port structure in the boundary wall structure and the port structure is selectively opened and closed when the metering chamber is in its first and second volumetric states, respectively.
- 15 4. The dispenser of claim 3, wherein the boundary wall structure has first and second wall members and the metering chamber is movable between its first and second volumetric states by relative movement of the first and second wall members between first and second positions, respectively.
- 20 5. The dispenser of claim 4, wherein the port structure is formed in the second wall member and wherein the first wall member is spaced from the port structure in the first position and closes the port structure in the second position.
- 25 6. The dispenser of any one of the preceding claims, wherein the metering chamber is further movable from the second volumetric state to a third volumetric state which has a volume less than the second volume, movement of the metering chamber from the second to third volumetric states causing dispensing of the metered volume through the outlet orifice.
- 30 7. The dispenser of claim 6 when appended to claim 3, wherein the port structure remains shut during movement from the second to third volumetric states.

8. The dispenser of any one of the preceding claims in which the metering chamber is reversibly movable between its different volumetric states thereby enabling the dispenser to dispense multiple metered volumes of the fluid product.
- 5 9. The dispenser of any one of claims 6 to 8 when appended to claim 4, wherein the metering chamber is movable between the second and third volumetric states by relative movement of the first and second wall members between the second position and a third position.
- 10 10. The dispenser of claim 9, wherein the first wall member is adapted so as to keep the port structure closed between the second and third positions.
11. The dispenser of claim 4, claim 5, or of any one of claims 6 to 10 when appended to claim 4 or 5, wherein the first and second wall members are
15 respectively movable and static wall members of the dispenser.
12. The dispenser of any one of the preceding claims further having a valve mechanism which acts to close the outlet orifice when the metering chamber is
20 between the first and second volumetric states.
13. The dispenser of claim 12 when appended to claim 6 in which the valve mechanism further acts to open the outlet orifice when the metering chamber moves from its second volumetric state to its third volumetric state.
- 25 14. The dispenser of claim 13 in which the valve mechanism is such as to return to a closed position in which it closes the outlet orifice when the metering chamber reaches its third volumetric state.
15. The dispenser of any one of claims 12 to 14 in which the valve mechanism
30 is a non-return valve.

16. The dispenser of any one of claims 12 to 15 in which the valve mechanism has a flap structure overlying the outlet orifice which selectively adopts opening and closing positions on the outlet orifice in response to the volumetric state of the metering chamber.
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17. The dispenser of any one of the preceding claims in which the outlet orifice is a spray-head.
18. The dispenser of any one of the preceding claims in which the bleed
- 10 arrangement is adapted in use to bleed the surplus volume of the fluid product in the metering chamber to the storage chamber.
19. The dispenser of claim 18 when dependent on claim 3 wherein the bleed arrangement is adapted in use to bleed the surplus volume of the fluid product to
- 15 the storage chamber through the port structure.
20. The dispenser of any one of the preceding claims in which movement of the metering chamber from its second volumetric state to its first volumetric state is such as to cause fluid product held in the storage chamber to be transferred to
- 20 the metering chamber.
21. The dispenser of any one of the preceding claims wherein the storage chamber moves from an expanded volumetric state to a contracted volumetric state in response to the metering chamber moving from the second volumetric
- 25 state towards its first volumetric state.
22. The dispenser of claim 21 in which the storage chamber is reversibly movable to the expanded volumetric state in response to the metering chamber moving from its first volumetric state towards the second volumetric state.
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23. The dispenser of claim 21 or 22 in which the storage chamber is caused to move between its expanded and contracted volumetric states by pressures

created by movement of the metering chamber between its first and second volumetric states.

24. The dispenser of claim 23 when appended to any one of claims 12 to 16,
5 wherein the valve mechanism has an opening pressure threshold which is greater than the pressure needed to move the storage chamber from its contracted state to its expanded state whereby the valve mechanism remains in a closed position during movement of the metering chamber from its first volumetric state to its second volumetric state.
- 10 25. The dispenser of any one of claims 21 to 24 in which the volume of the expanded volumetric state of the storage chamber decreases after each metered volume dispensed.
- 15 26. The dispenser of any one of claims 21 to 25 in which the storage chamber has a boundary wall structure having first and second wall members which move relative to one another between first and second positions to bring the storage chamber to its expanded and contracted volumetric states, respectively.
- 20 27. The dispenser of claim 26 when appended to claim 3 in which the port structure is located in the first wall member of the storage chamber with the second wall member of the storage chamber being spaced from the port structure in the first position.
- 25 28. The dispenser of claim 27 wherein the spacing of the second wall member from the port structure when in the first position decreases after each metered volume dispensed.
29. The dispenser of any one of the preceding claims which is hand-held with
30 the dispensing mechanism hand-operable.

30. The dispenser of claim 9, or claim 10 or any one of claims 11 to 29 when appended to claim 9 or 10 in which the first wall member of the metering chamber is operatively connected to an actuating arrangement which in a first mode of operation moves the first wall member to the first position and in a
5 second mode of operation moves the first wall member to the third position.

31. The dispenser of claim 30 in which the first wall member of the metering chamber forms the head of a plunger structure of the actuating arrangement which is mounted for reciprocal movement in the dispenser for moving the head
10 between the different positions relative to the second wall member.

32. The dispenser of claim 4 or any one of claims 5 to 31 when appended to claim 4 in which the first wall member of the metering chamber forms an end wall of the metering chamber which is mounted for sealing slidable movement on the
15 second wall member.

33. The dispenser of claim 26 or any one of claims 27 to 32 when appended to claim 26 in which the second wall member of the storage chamber forms an end wall of the storage chamber which is mounted for sealing slidable movement
20 on the first wall member.

34. The dispenser of claim 30 or 31, wherein the actuating arrangement has a biasing member which biases the first wall member of the metering chamber to the third position in the second mode of operation.
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35. The dispenser of any one of the preceding claims having a fluid product contained in the storage chamber.

36. The dispenser of claim 35 in which the fluid product is selected from the
30 group consisting of a liquid, a viscous product, a powder and a gas.

37. The dispenser of claim 35 or 36 in which the fluid product is a medicament.

5 38. A dispenser unit having a dispenser according to any one of the preceding claims in which the outlet orifice is an outlet orifice of the unit through which the metered volume of the fluid product is, in use, dispensed to the external environment.

10 39. A device unit having a dispenser according to any one of claims 1 to 37, wherein the outlet orifice is an internal orifice of the unit through which, in use, the metered volume of the fluid product is dispensed into the unit.

15 40. The device unit of claim 39 further having an outlet orifice which opens to the external environment about the unit and means for conveying the fluid product dispensed through the internal orifice to the external environment through the outlet orifice.

20 41. The device unit of claim 40 in which the conveying means is such as to change the state of the fluid product.

42. The device unit of claim 40 or 41 in which the conveying means has a vibrating element to aerosolise a liquid dispensed by the dispenser.

25 43. The device unit of claim 42 in which the vibrating element is a piezoelectric element.

44. A dispenser substantially as hereinbefore described with reference to, and as illustrated by, the accompanying Figures of drawings.

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